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The

Bitter Water of Friedrichshall


by

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Translated from the German

by

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"The chlorides of sodium and magnesium and the bromide of magnesium, which the bitter water of Friedrichshall contains, place them among the most efficacious in Europe, and I regard the possession of this spring as a real treasure, whose great worth must be recognised by all who have experienced its salutary and beneficial effects."

Dr. Just. von Liebig

Wurzbourgh.

Typography of Michael Walz.

1865.

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I. Historical and topographical notice of the Spring of Friedrichshall.

In the duchy of Saxe-Meiningen (at) 5 leagues from Hildburghausen and 4 from Coburg in the lovely valley of the Greck, fountains of mineral water are seen to gush out, which for some years have attracted the attention of the public and especially that of medical men, as yielding the water so renowned and so extensively used under the name of „The Buter Water of Friedrichshall“. The hollow of the valley rests on a subsoil of secondary formation, consisting of strata more or less coloured and hardened marl, clay, sandstone and gypsum. These beds alternate continually to a depth at present undetermined; at least the boring practised by M. Glenk in 1825 which went to a depth of 800 feet did not reach below this alternation. To the north and northwest these secondary beds are traversed by more or less considerable masses of basalt, and particularly the Festungsberg, in the neighbourhood of Heldburg, which closes the valley of the Greck towards the west, is entirely of basalt.

In the valley which is shut in towards the east by parallel lines of mountains we find also a great quantity of gypsum whilst on the other side of the two lines of mountains, that is to say, beyond the valley of the Greck, the carbonate of lime appears in the form of calcareous Spar.

But what deserves particular attention is the carbonate of lime and magnesium or the dolomite, which is found on the western slope of the mountains, and which extends even to Coburg and Hildburghausen, but, only at a certain elevation, for instance on the summit of the Festungsberg of Coburg. These circumstances lead us to think this car-

bonate of lime and magnesium participates in the formation of the spring of Friedrichshall, and as the height of its appearance indicates at the same time the depth of the layer of dolomite, one may guess approximatively the places where they form the bitter salts. The waters of Friedrichshall such as they flow from their sources are probably a mixture 1st of a saline spring arising from an unknown depth; 2^{ndly} of a solution of chloride of magnesium and of sulphate of magnesia, which mixes with the former in a higher stratum and 3^{rdly} of fresh or spring water which oozes in and penetrates in many places.

The spring of Friedrichshall has served from time immemorial for the production of kitchensalt. In 1158 this spring was, according to documents still existing, given as a fief by the bishop Eberhardt of Bamberg, to the monastery of Langheim; but even in those times it was impossible to ascertain the precise date of its discovery. At that time the mineral spring appears to have been highly concentrated, and the salt works were in active operation for some centuries up to 1425 when the spring was demolished by the Hussites, so that afterwards the original well could not be discovered.

The spring, therefore, remained unused for nearly three centuries, when in 1714 a certain Heydenblut of Hildburghausen dug new wells in different places and made fresh attempts at boring. Unfortunately, the efforts of this enterprising man, were not successful, he sacrificed his fortune without attaining his object: for in spite of his discovering every where a source more or less abundant of saline water, he did not succeed in preventing the fresh water from spoiling the saline spring. His successors were not more fortunate in their labours and even Mr. *Glenk*, abandoned in 1825 a well which he had sunk to a depth of 800 feet; though partly also because in his other borings he had obtained better results, which he wished to follow up.

In the last century, the medicinal salts which were found abundantly in the water of the well dug by Heydenblut excited the attention of medical men and of the government; it was worked at, and as early as the latter half of the past century Professor *Delius* drew attention to the Glauber's-salt obtained from this spring.

Nevertheless it was not till the commencement of this century, that following, the advice of professor *Pickel* of Wurtzburg, this spring was worked so as to yield annually from 600 to 800 quintals of Glauber's salt, from 300 to 350 quintals of sulphate of magnesia, and only 400 to 500 quintals of common salt. Subsequently the salt works became more and more neglected, and the conduct of the process was entrusted to mere workmen.

At last a new era dawned upon the history of this spring: in 1838 the celebrated chemist *Creutzburg* at the instance of the government of Meiningen analysed it: the result was published in *Erdmann's* Journal of practical chemistry for that year; and about this time the salt spring was first let, and very soon afterwards sold to Mr. *Oppel*, an intelligent farmer in the neighbourhood.

The analysis of Mr. *Creutzburg* joined to the change of proprietorship of the spring would have had, however, no great success, but that on the one hand Dr. *Bartenstein* of Hildburghausen guided by this analysis conceived the idea, obvious enough, it is true, but at that time quite novel, of working this spring as a mineral spring, while on the other hand Mr. *Oppel* endowed with an enterprising spirit and rare perseverance, was just the man to realise the ideas of Dr. *Bartenstein*. These two then combined forthwith to procure and supply the Friedrichshall water; and from that period Dr. *Bartenstein* displayed an activity and skill deserving of the greatest notice. He sent the water to a great number of medical men of his acquaintance, far and near, begging them to submit it to the most rigid and careful experiment. Further he engaged Mr. *Creutzburg* in 1843, Mr. *de Liebig* in 1846, and Mr. *Bauer* in 1847, to make new analyses, at last giving up his own medical practice, he made long and frequent journeys through Germany and elsewhere for the purpose of recommending personally to the physicians of all countries the powerful remedy which he had discovered.

In the span of eight years, a time comparatively but short, the sale of Friedrichshall bitter water amounted to 350,000 bottles per annum. It was in great demand, not only in Germany but also in Switzerland, France, Belgium, Holland, England, Denmark, Poland, Russia, Hungary, and

Italy; it was even sent to Greece, Sicily, and America. But the greatest triumph, of this water, is that it is extensively used in Austria, which is so rich in excellent bitter waters. But, alas! Mr. *Bartenstein* was not to enjoy the fruits of his discovery; whilst returning from a journey through France, he had an attack of apoplexy under which he sank on the 13th of April 1854.

He had nevertheless the consolation of having realised and confirmed an idea which he had warmly cherished, and even to the latest moment of his life, he occupied himself with further projects for the advancement of his discovery.

Moreover the establishment founded by Dr. *Bartenstein* for the working of the „bitter water“ exercises a remarkable influence over the working classes of the neighbourhood, since a great many persons are employed in filtering, filling, and packing the water, in the manufacture of bottles and packing cases, in the conveyance of the water to the railway station and the commercial affairs of the establishment. In spite of all this the government of Meiningen never deigned to recognise by any honourable mention the merits of the founder.

II. Physical and Chemical properties of the Friedrichshall Bitter Water.

The water of Friedrichshall are obtained as a natural spring from well, sunk in 1825 by Mr. *Glenk*, without any admixture as is the case with the Bitterwater of Kissingen.

This water is bright and clear, only that in great bulk it is tinged with yellow. It is inodorous, but has a salt and bitter taste like that of the bitter waters of Bohemia, but milder and less disagreeable. There are but very few people who have a decided aversion to this water. In stoppered bottles it keeps for many years without the least alteration, and according to observations which have been made on that point, it is proved that it keeps for seven years and more. But when by chance a small particle of any vegetable substance, as for instance a fibre of straw, falls into the bottle, then a small quantity of sulphated salt is formed, and a little sulphuretted hydrogen distinguishable

by its well known odour, is set free. But if we leave open for a time a bottle smelling slightly of sulphuretted hydrogen, it loses this odour, while the efficacy of the water is not diminished.

According to the analysis made in 1847 by Mr. *Lizbig* the water contains :

	in 1000 parts	in 10 Uss.
Sulphate of soda *	6,0560	16,510 grain.
" of potash	0,1982	1,523 "
" of magnesia **	5,1502	39,553 "
" of lime	1,8465	10,341 "
Carbonate of lime	0,0147	0,113 "
" of magnesia	0,5198	3,993 "
Chloruret of sodium	7,9560	61,102 "
" of magnesium	3,9390	30,252 "
Bromide of magnesium	0,1140	0,875 "
Silica	traces	traces "
Organic matter	traces	traces "
Free Carbonic Acid	0,4020	5,522 "
	25,2544	194,261 "

As it flows from its source, the bitter water of Friedrichshall contains also a little iron, which is lost like that of the Krenshbrunn water in Marienbad, when it is sent out in clay bottles. Nevertheless Mr. *Kutner* has still found iron dissolved in the bitter water when exported. By physical and chemical experiment often repeated, that chemist has convinced himself, that the carbonic acid is intimately combined with the other constituents of this water, and he regards all the elements indicated in the analysis, including the iron, as forming an unique salt. We will not stop to examine the reasons on which this opinion is founded, but what ought to be noticed is that the "bitter water" of Friedrichshall, as a curative agent, must be considered in its integrity, and we abstain from drawing theoretical conclusions from its component parts as to the therapeutical effects of the water, seeing that the action of each of these elements may be very probably modified by that of an other.

* and ** as a double salt.

III. Physiological effects of the Bitter Water of Friedrichshall.

The physiological effects of the Friedrichshall Bitter Water which at first were observed, are, an increased appetite, an improvement of the digestive powers, a regular state of the bowels and great relaxation of the same, if taken in large doses. When Mr. *de Liebig* directed his attention to this water, he soon ascertained, that by its use, the uric acid existing in excess in the urine, diminishes and the phosphoric acid declines to a minimum; and these effects appear after using it only three days. Dr. *D'Alquen* in London has found by means of microscopical researches that by the use of this water the colouring matter in the urine is likewise diminished. From further clinical observations it appears, that this water acts not only on the mucous membrane and glands of the alimentary canal, but acts equally beneficial, as a gentle stimulant and corrective, on the biliary, respiratory, urinary and sexual organs.

These observations have quite recently been confirmed by the exact investigations of Dr. *Mosler* in Giessen.

He found by giving small doses of 150 to 250 grammes (5—8 ounces) which are best calculated for obtaining its physiological effects:

1. a slight increase in the floss of the urine,
2. an augmentation in the quantity of urea eliminated with the urine in the 24 hours,
3. an increase of the chlorides, after making proper allowance for the quantity taken into the system, contained in the Bitter Water,
4. decrease in the quantity of uric acid for the 24 hours,
5. a very gentle action on the bowels, with a rather darker shade in the colour of the faeces,
6. a slight increase of the animal heat and
7. a slight decrease in the formation of fat as had already formerly been observed by Dr. *Bartenstein* in cases of an excessive or morbid deposition of fatty matter.

From an analysis of all the data and facts, which have resulted from the various observations and researches as far as they have extended at present, the physiological effects of the Bitter Water on digestion, formation of blood, circulation, nutrition and on the destructive assimilation or organic metamorphosis (Stoffwechsel) — may thus be stated.

1. *Digestion.* The action of the Bitter Water of Friedrichshall on the stomach, shews itself above all, by an augmentation of the appetite. It is for this reason, that in the vicinity of Friedrichshall, amongst the country people, it bears the name of "appetite water". Its beneficial effects on the biliary organs might be inferred not only from the increase of colouring matter of the bile found in the excretions during its use, but also from the fact, that many cases of jaundice and enlargement of the liver etc. have been cured by it.

The improvement of the digestive power is shewn by the absence of all unpleasant feelings even after a hearty meal, by the prevention of that troublesome distention of the stomach by gases which accompanies imperfect digestion and by the regular state of the bowels.

2. *Formation of blood.* A proper formation of blood is the necessary and natural result of a good digestion — therefore the only question which could arise here would be the oxydation of the blood in its passage through the lungs. It is true, we have no direct proofs regarding it, but indirectly an improved sanguification, might be inferred from the Observations of Dr. *Bartenstein*, that the use of the Bitter Water imports to the skin a more healthy and better colour. Moreover the Bitter Water acts beneficially on the whole mucous membrane of the air passages. Dr. *Strumpf* observed that it made the voice much clearer and tolling and according to my own and Dr. *Bartenstein* experiences the Bitter Water removes various catarrhal affections. We have therefore no reason to doubt its beneficial effect on the functions of the respiratory organs. Perhaps it is not out of place, here already, to refer to a fact, which will be more fully discussed further on, viz. the increase of urea and decrease of the uric acid in the urine during the use of the bitter water, which clearly points to a more complete oxydation

going on in the system, which process though carried on through the whole capillary system, commences in the lungs. Also the increase, although only a slight one, in the natural heat of the body is the result of a more active oxydation and its effects.

3. *Circulation of the blood.* We are fully warranted in saying that the Bitter Water has a most happy effect on the circulation and tends to an equal distribution of the blood in all parts of the body. Although we are unable to prove this by purely physiological observations yet abundant therapeutical data are on record to establish the truth of our assertion and especially those facts, which prove, that the Bitter Water occasions a determination of blood to the pelvic viscera viz its acknowledged power as an emmenagogue, its efficacy in the removal of the congestions, so marked in pregnancy and in cases of chronic determination of blood to the head and chest of which more further on.

4. (Stoffwechsel) Process of decay and renovation of the organic tissues — organic metamorphosis.

Moleschott has shewn, how the nutrition of the organism is effected, by the ingesta being gradually deprived of their oxygen while during the process of decay and regeneration (destructive assimilation) all parts of the body take up oxygen and undergo a process up real combustion. Those parts or tissues which consist of nitrogen are with the exception of Lencin and Tyrosin, converted chiefly into urea and eliminated out of the body with the urine; those parts which contain no nitrogen are converted into carbonic acid and aqueous vapour and exhaled through lungs and skin.

It needs scarcely be stated, that the respiration, besides providing for the eduction out of the body, of the products of combustion going on within the system, has biologically speaking, far higher and more important functions to sustain in the animal oeconomy and must also provide all the oxygen, necessary for the process of oxydation going on within our body. If the oxydation of the effete nitrogenous material is insufficiently carried on, uric acid is produced instead of urea and the nonnitrogenous hydro-

carburers are only partly converted into carbonic acid and aqueous vapour and partly into fat. Now the Friedrichshall Bitter Water has the remarkable property of greatly promoting this process of oxidation of effete matter and its elimination out of the system in the form either of urea or of carbonic acid and aqueous vapour; the removal of effete matter is the first step in the process of regeneration and reproduction and as it cannot be doubted, that the Bitter Water controls the eliminative processes and separates the anabolic matter from the blood, it must be considered a great purifier of that fluid and one of the best agents, by sufficient and proper nourishment, for the preservation of a sound and vigorous state of bodily health. We have already before referred to the fact, that the animal heat is slightly increased after taking the Bitter Water in consequence of an increased activity in the process of combustion going on within the body. Dr. Moser observed that the natural temperature of a person, selected for the purpose of this experiment, after taking 150 grammes of bitter water, rose from 37.36° C. to 37.47° C. and only to 37.40° C. after taking 500 gr. of the water. It seems therefore that the Bitter Water increases the temperature of the organism until copious saline discharges begin to interfere. It, as we have shown above the Friedrichshall Bitter Water prevents not only an excessive formation of uric acid or fat but promotes also in a high degree the resorption of morbid fatty depositions, then these results are of as great an importance that the attention of all observers should be directed to this remarkable water, in order to obtain if possible by the most careful conducted researches on a large scale, a better and deeper insight in the nature of the whole series of organic processes which are manifestly under the influence of this water.

Experiments and investigations of the kind, it is true, could scarcely be satisfactorily conducted except in a physiological or clinical institution; however, we are convinced, that the proprietors of this water, Messrs. Oppel and Cpy, who have devoted already so large a sum, to the study of the chemical and clinical properties of their water, would not be deterred from making a still greater sacrifice if

thereby a more extended and accurate knowledge *) of the general and special properties of this wonderful water in all its bearings as a remedial agent, could be obtained.

IV. Therapeutic effects of the Bitter Water of Friedrichshall. **)

1) *Its effects in the diseases of separate organs and systems.*

A. Therapeutic action on the diseases of the mucous membranes and the glandular system.

a) *Diseases of the stomach.*

The bitter water, as we have already observed improves the appetite and digestion and in this respect it has been found efficacious, whether the disorder of the functions of the stomach, proceeds from errors in diet, from an excessive use of beer or other fermented liquors; from gastric catarrh, or from weakness of the digestive organs in old age. It is, above all, against nausea from excess in wine or beer that the bitter water shews its efficacy, and Dr. *Strumpf* particularly recommends this water for atony of the digestive organs, in drunkards. If indigestion is accompanied by putrid eructations, Dr. *Strumpf* advises the addition of a little lemon juice to the bitter water. Though the bitter water augments the appetite it has nevertheless cured a case of *canine appetite* which came under the observation of Dr. *Schneider* Medical councillor of Fulda.

From gastric catarrh to chronic gastritis is but one step; and it must not astonish us that the bitter water of Friedrichshall is also efficacious against the latter disease. Dr. *Bartenstein*, *Dorsch* in Fulda, and *Strumpf* as also myself, have all employed it successfully in these cases. Dr. *Strumpf* cites on instance, when pains of the stomach

*) Based upon the most carefully and strictly scientifically conducted researches.

**) In the course of 20 years I have made many observations and experiments with the bitter water, and in adducing the numerous observations of others, I do so to complete the number of facts and to avoid the charge of exaggeration.

caused by taking ice when the body was overheated, were cured in a short time by this water although the pains had been of two years standing.

An other case still more surprising, observed by Dr. *Strumpf*, was that of a young man of three and twenty who had suffered from very severe pains of the stomach, with heart-burn, and vomiting for eighteen months, which recurred constantly an hour after meal, so that the patient could no longer bear any kind of food but a little milk, his stomach was so sensitive, that it became painful even from lying straight in bed. This patient was completely relieved from his malady in the space of eight day by taking a wineglassful of the bitter water of Friedrichshall morning and evening. Nevertheless I must not conceal that in a few cases which I have treated, and where the symptoms of chronic gastritis were accompanied by constipation, the bitter water of Friedrichshall could not be borne even diluted with equal parts of fresh water, and I was obliged to employ the nitrate of silver which removed the disease very quickly. Dr. *Bartenstein* has cured with this water several cases of obstinate chronic vomiting accompanied by great emaciation; and he assures us, that it also removed (for a time) the distressing sickness in a case of cancer of the stomach.

The action of this water against hæmorrhage from the stomach is also worthy of notice. Dr. *Bartenstein* has published two cases of the kind. The first patient, a woman aged 40 years was subject to vomiting and purging of blood every spring for ten years; these attacks were in February preceded by an eruption of hæmorrhagic spots all over the left side of the body. For some years the patient was ordered the bitter water at the outbreak of the spots, drinking a wineglassful every morning for a fortnight; and this treatment sufficed to put an end to the hæmorrhages. One year the bitter water was not given till the hæmorrhage had already begun; she now took a table spoonful of the bitter water every three hours; the vomiting stopped immediately after the first dose, the bloody stools disappeared in a few days, and at the end of a week the woman had recovered from the attack.

The second patient who was suffering from haematemesis, with enlargement of the spleen, was also cured by the bitter water in doses of a tablespoonful.

b) Diseases of the intestinal canal.

The bitter water of Friedrichshall is a powerful remedy in constipation, whether habitual or temporary. Employed according to circumstances, it cures habitual constipation, not only for the time during which it is used, but permanently, and without any other unpleasant effects. But in constipation resulting from paresis of the intestinal muscles in chlorotic persons the efficacy of this water, when used alone, is necessarily doubtful; but we may attain our object by adding to the bitter water small doses of the *fabæ sancti Ignatii* or of *nux vomica*.

Dr. *Strumpf* also praises the efficacy of the bitter water in blennorrhoea of the intestinal canal.

c) Diseases of the Pancreas.

I have published, in the „*Prager Vierteljahresschrift*,“ a case of chronic inflammation of the pancreas, cured by the bitter water. It had all the symptoms indicating an affection of the pancreas, that is, loss of appetite, pains extending over the chest, and accompanied by a sense of oppression or dyspnoea, emaciation, very low spirits, an earthy complexion, &c.; One symptom only was wanting, which was fatty matter in the scanty stools. All the various stomachic remedies remained ineffectual; but the bitter water removed the complaint in a very short time.

d) Diseases of the liver.

The bitter water of Friedrichshall quickly cures simple jaundice, as well as congestion of the liver, with or without jaundice. Dr. *Bartenstein* cured, by means of it, an enlargement of the liver, which shewed itself as a sequel of typhus, and was combined with ascites and anasarca.

The same physician also cured, with the bitter water, an enlargement of the liver attended with abdominal dropsy, following a tertiary fever.

Dr. *Pfrenger* a physician of Coburg in like manner cured a case of enlarged liver, complicated with a serious affection of the tracheal mucous membrane which also

followed an intermittent fever, that had lasted for nine months. Finally Mr. *Schneider*, a member of the medical council, assures us that he cured, solely with the bitter water of Friedrichshall, three cases of jaundice accompanied by induration of the liver, that organ being as hard as a stone. The same physician has also seen a woman relieved of six biliary concretions, of the size of a pea, after using the bitter water. And quite recently my friend Dr. *d'Alquen* of London has given me the history of an English lady, who was affected with great irritability, mental disturbance, yellowness of the skin, and habitual constiveness resulting from obstruction in the liver; she was cured by this water and cannot sufficiently praise it.

e) Diseases of the urinary organs.

The bitter water of Friedrichshall has in some instances caused calculous sand and even small stones to be passed. *Naumann*, professor of medicine at Bonn, has cured with the bitter water, used for five weeks, two cases of albuminuria accompanied by oedema of the lower extremities. Lastly Dr. *John Weber* has cured, with the bitter water of Friedrichshall, catarrh of the bladder, a disease which, as is well known, has hitherto resisted all internal treatment.

f) Diseases of the organs of respiration.

Only recently I again had an opportunity of convincing myself how quickly the bitter water (in large doses) removes acute Bronchial Catarrhs. Dr. *Heppmann* a Superior medical Staff Officer has confirmed this observation in his own person. Professor *Naumann* of Bonn has employed this water with distinguished success in epidemic influenza, by prescribing a table-spoonful every two hours. Also in chronic pulmonary catarrh the bitter water has been found very efficacious and even cases of blennorrhoea from the lungs have been cured with it, which had resisted other remedies and especially I have known, chronic bronchial catarrhs in children of a scrophulous diathesis, disappear comparatively speaking in a very short time.

g) Diseases of the sexual organs.

I have already said that this water occasioned a determination of blood to the pelvic viscera, and that it acts

as a powerful emmenagogue. Dr. *d'Alquen*, of Mühlheim near Cologne, has also seen the catamenia return in such cases, when borax and even savine had been employed without effect. It is self evident, however, that it is indicated only in those cases which are not complicated with anæmia or amenorrhœa.

The use of this water is very advantageous in the numerous accidents, at times very serious, and of occasionally obscure origin, which so many women are subject to at their critical age. I know of no remedy preferable to the bitter water under these circumstances. It appears in many cases to effect a cure by producing hæmorrhoidal discharges in place of menstruation, in other cases health returns without the occurrence of any flow of blood. At all events the remark of Dr. *d'Alquen* of Mühlheim deserves consideration, „that sometimes after the use of this water by women, who have long ceased to menstruate, a flow of blood has again occurred.“

B. Diseases of the vascular system.

According to the observations of professor *Naumann* the bitter water of Friedrichshall is a sure remedy against that irritability of the heart and blood vessels, which is particularly frequent in young people of both sexes, most generally towards the time of puberty, but also at a more advanced age. This irritability is followed by various symptoms which gradually assume the form of idiopathic diseases. Sometimes there are violent headaches, with determination of blood to the head, which do not cease till after brisk bleeding from the nose.

At other times a train of acute catarrhal affections sets in characterised by violent palpitation of the heart, and generally by paroxysms of a dry cough, by a dull pain in the forehead and an abundant watery secretion from the nose. Again at other times there are palpitations of the heart, anxiety, tightness across the upper part of the abdomen, and constipation followed by irritating bilious evacuations causing tormina. The bitter water of Friedrichshall, in moderate doses, taken at intervals, or alternately mixed with bitter almond water, or with vinegar of digitalis, is proved to have great efficacy in these cases. This

water is generally curative in all cases of determination of blood to the head or chest. Persons who are accustomed to lose blood for these determinations, and who have thereby aggravated rather than ameliorated their condition, have found in this water a satisfactory remedy. The use of the bitter water is also serviceable against plethora the cause of which is still so little understood.

Even in chronic affections of the heart the bitter water has been given with the best results. Dr. Mosler treated three cases of Hypertrophy of the heart without disease of the valves — two cases of insufficiency of the mitral valve with excentric hypertrophy of the right heart and one case of insufficiency and stenosis of the mitral valve and hypertrophy with this water and with great alleviation. Professor Bamberger likewise speaks favorably of the use of the bitter water in diseases of the heart and its valves.

In the spring 1862 I was consulted by a gentleman who suffered from enlargement of the right heart, secondary catarrhal affection of the lungs, great difficulty of breathing, oppression and oedema of legs. Besides a few doses of Digitalin and Iron I recommended him to take the bitter water for some time. This patient who was formerly confined to his room and who looked already far gone, is now able to take long walks without experiencing any difficulty in breathing, eats and drinks with appetite, looks well and states that only at times he is slightly reminded of his former sufferings.

Finally we must observe that it is an excellent remedy against the congestions so marked in pregnancy, and is used with obvious effect against those symptoms. That by its use the obstruction also occurring in pregnancy, in the veins of the kidneys and the albuminuria resulting there from, is diminished, or removed, is at present but a conjecture. It is certain, however, its employment has exercised no unfavorable influence on pregnancy, childbirth, or lying in.

C. Diseases of the nervous system.

As the bitter water of Friedrichshall can hardly produce any direct physiological effect on the nervous system, it cannot cure any idiopathic disease of the nerves, on the

other hand it exercises a beneficial influence on all those nervous affections* which have their source in an irregular circulation of the blood, in cerebral congestions, in abdominal affections, or in certain morbid states of the blood. I will not cite here the various forms of neuralgia against which the bitter water has had a powerful effect, nor will I attach any importance to the fact, that some observers have employed it with success against many convulsive diseases in infants, caused by a derangement of the digestion;*) but I feel bound to observe that in mental affections where derivative or resolvent remedies are indicated, this water is powerfully efficacious.

It is also in use at many lunatic asylums including those of Bamberg, Bendorf, Erlangen, Halle, Hildburghausen, Statbuge & Sachsenberg; and Dr. *Erlenmayer* at Bendorf near Coblenz recommends this water in preference to all other mineral waters for its efficacy in fitting cases. At the same time I must also observe that according to the testimony of Mr. *Damerow* of Halle and Mr. *Harnisch* of Hildburghausen the same doses of the bitter water of Friedrichshall sufficed, for the insane as for other patients, whilst other remedies, as is well known, must be given to the insane in larger doses.

2) *Therapeutic effects of the Bitter Water in constitutional diseases and in cachexia.*

In all acute, or febrile diseases, where purgatives, refrigerants, derivatives, and resolvents, are indicated, the bitter water of Friedrichshall deserves to be particularly recommended, as it produces the desired effect in comparatively small doses. It has been employed with success in erysipelas, not only as a cooling purgative but also because of its peculiar action on the liver. Given in small doses in scarlet fever, in rubeola, and in variolous diseases, it is not only perfectly harmless, but it favors the action of other remedies. Up to the present time I am not able to support by satisfactory cases my opinion as to the action

*) Dr. *Hirsch* in Danzig, wellknown for his researches in pathological History cured with the Bitterwasser a case of Epilepsy resulting from abdominal disorder.

of this water against the affections of the kidneys in scarlet fever, and of the lungs in measles: to do that would require a great number of facts.

But what is the therapeutical value of this water in abdominal typhus? This question deserves particular attention. In France according to Messrs Bretonneau and Delaroque, they often employ the bitter water of Saitschitz alternately with tartar emetic, in abdominal typhus, with considerable success; for according to statistical tables this mode of treatment, gives only a mortality of 8 per cent., while all the other remedies in use in France and Germany against abdominal typhus have had results far less satisfactory. Dr. Schönfeld a physician of Charleroi in Belgium, has also employed the bitter water of Friedrichshall in abdominal typhus, and he assures us that he had obtained from it generally satisfactory results, and that in some cases he has shortened with this water the duration of the disease, even when it was ushered in by alarming symptoms.

Lastly I venture to speak also of cholera morbus.⁴ After Messrs Stevens and Aron had employed kitchen salt with success as a drink, and as an injection in the most violent forms of cholera morbus and after Jules Guyot, Lauzer & Bourgeris d'Etampes, had found sulphate of soda and Seidlitz water, and Gobbe, the citrate of magnesia so effectual against the diarrhoeal stage of cholera morbus and even in cholera when fully developed, it is no to be doubted, that the bitter water of Friedrichshall, so rich in chloride of sodium, in sulphate of soda, and in magnesia, must, when given in small doses often repeated, prove very efficacious so long as absorption is not yet altogether arrested, but in the absence of decided observations on the point I shall content myself with thus having drawn attention to it.

Among chronic diseases, it is especially over hemorrhoids that the bitter water of Friedrichshall exercises the most beneficial effects. I have myself observed many cases when patients, entirely prostrated both in mind and body, have, through this salutary water, completely recovered their physical and moral powers and who in the enjoyment of good health and spirits, have, as it were, tasted a second time the

pleasures of youth. These cases are, moreover, too frequent to necessitate being specially instanced.

The bitter water removes obstructions in glandular organs of the abdomen, and of the portal vessels, it cuts off the reflex effects of these abdominal diseases, and improves digestion and nutrition. The effects of this water are at times still more surprising, when hemorrhoidal disease occasions great congestion in one organ or another, and I cannot refrain from citing some examples of this. Mr. *Schneider*, member of the board of health of Fulda, says speaking of himself, that in consequence of hemorrhoids and fulness of blood accompanied by great congestion to the head and chest, he was, every year, obliged to be bled many times and to apply leeches behind the ears, and to the hemorrhoidal tumors; but that since he had made use of the bitter water of Friedrichshall he has been able to dispense with all blood letting. Mr. *Dotzauer*, member of the board of health of Baireuth, cured in four weeks with the bitter water of Friedrichshall, a man 38 years old, who in consequence of plethora and stagnation of blood in the abdominal organs suffered from a disordered circulation of the blood, giddiness, pains in the head, and oppression of the chest, with irregular and often intermittent pulse, and who among other remedies had used the waters of Kissingen without having obtained any advantage from them. The use of the bitter water of Friedrichshall produced a moderate hemorrhoidal flow, and the above mentioned symptoms disappeared without recurrence. A government employé, aged 48 who had never been addicted to any kind of dissipation, and lived happily with his wife by whom he had healthy children, suffered without any known cause from nocturnal emissions of semen, followed each time by great cerebral congestion so that he, as well as his wife, became alarmed, and feared he would have an apoplectic fit, especially as the face of the patient became extremely red, even livid, while his head was hot and his spirits were depressed. Many physicians had already employed various remedies in his case, which all remained without effect. It appeared to me a case of hemorrhoidal congestion towards the neck of the bladder: I

ordered the bitter water of Friedrichshall, and in a few days the patient was cured.

On the side of hemorrhoidal disease must be placed gout, which is akin to it. In gout, at least in the commencement the blood abounds in uric acid. But as the bitter water of Friedrichshall, as we have seen above, drives off the superfluous lithic acid of the urine, and in consequence also that of the blood, it is clear therefore that it suppresses the source of the formation of uric acid, and we may, therefore, conclude, before hand that the bitter water of Friedrichshall will prove a powerful remedy against the sthenic form of gout, (or *arthritis validorum*) and, indeed, observation has established the correctness of this conclusion: Dr. Winterich and Welsherr of Erlangen have radically cured two cases of gout by means of this water. According to the testimony of Dr. Bartenstein, the bitter water of Friedrichshall is also efficacious against scrofula, which was to be expected from the presence of bromide of magnesium in this water. Nevertheless I have not as yet sufficient data for establishing this property of the bitter water.

Finally since Dr. Bartenstein asserts that he himself has also cured anæmia, with this water, we must not omit to notice these facts, but whether it can by itself or in combination with other means display so marked an efficacy, that it may supersede other antichlorotics, I purpose instituting precise investigations on that point.

Among the various cases of poisoning it is against painter's colic that the bitter water is of most tried efficacy. It acts here not only as a laxative, but also as a chemical antidote: for the sulphuric acid contained in the sulphate of magnesia combined with the oxide of lead, which it meets in the body and changes it into an insoluble salt.

3) *The Bitter Water of Friedrichshall as an adjuvant or as a preparative for the exhibition of other mineral waters.*

In most of the mineral baths of Germany as in those at Aix la chapelle, Burtchwil, Baden-Baden in the Grand duchy of that name, Baden in Switzerland, Baden near

Vienna, Gastein, Teplitz, Warmbrunn, Wiesbad, Wildbad, and in all the marine baths, from Swinemünde to Ostend, the bitter water of Friedrichshall serves as an auxiliary.

When taking these baths, we order the bitter water for the purpose of removing all those symptoms against which the water of the baths would be powerless. It is, however, not the same with the ferro-acidulated waters: many of these waters such as those of Ragozy in Kissingen, and those of the Elizabeth Spring at Homburg, cannot be borne by many persons, on account of their iron, which instead of acting as an aperient produce constipation, and serious cerebral and pulmonary congestion; if, two or three days before using the mineral water of the baths these patients take daily half a glass of the bitter water of Friedrichshall, the action on the intestinal canal is secured, and the patients then bear the chalybeate water very well.

V. The Bitter Water of Friedrichshall as a Cosmetic.

It has been before said that by the use of the Friedrichshall water the skin becomes softer, and its colour clearer and ruddier, and the voice more sonorous; while excessive corpulence is prevented; a remedy which produces such effects may surely be pronounced a cosmetic, or beautifier, in the most comprehensive meaning of the term. But not to raise expectations which this water may be as far from realising as any other remedy, I must observe that this beautifying can only be practicable within the fixed limits of each individual structure: the skin cannot be made fairer, than it came from the hand of nature, but the Friedrichshall water can restore it to its original fineness and colour, which it may have lost through a morbid state of the blood or defective nutrition, and in fact we often see the yellowish or earthy complexion disappear after its use. The voice can be no other than as it is formed by the construction of the larynx and vocal chords; but it may attain the utmost clearness compatible with its construction, inasmuch as by the use of the bitter water the secretions of the mucous membrane of the vocal organs are improved and the corresponding nerves invigorated.

In a word the beauty which the Friedrichshall water produces, is that which results from good health.

VI. Directions for using the Bitter Water of Friedrichshall.

The water of Friedrichshall, like all other bitter water has been ordered by most medical men, only, in large doses, or as a laxative. Nevertheless this method permits but a very limited use of this water, for the mode of using it must be regulated according to the object they wish to attain. If we have in view to put an end at once to a case of constipation or if we have to remove, as soon as possible, a dangerous cerebral or pulmonary congestion, or else, if in febrile diseases, we wish to moderate the action of the vascular system by suitable evacuation, or if we purpose to attack the febrile disease itself, with the bitter water, as for example, abdominal typhus or erysipelas, we shall undoubtedly do well to order the bitter water in large doses that is to say from eight to sixteen ounces daily, but divided into equal doses, until we have obtained the desired evacuations; whether the chief object be attained, or whether we must continue to give these doses for some days, or lastly, whether the way being once opened, we continue to use the water in small doses. On the other Hand, in all chronic diseases where it is wished to stimulate the organic functions, to facilitate secretion and absorption, to promote the excretions, to remove congestion and obstructions, or to disperse swellings it is then that we must remember the maxim: *Gutta cavat lapidem non vi sed sæpe cadendo*, and conformably to this truth the bitter water must only be ordered in small doses, often repeated, and for a considerable time. Half-awakingful of the bitter water, taken night and morning is the ordinary dose to begin with: we may even commence with still smaller doses and take a table-spoonful every two or three hours. As soon as the action of the bitter water on the intestinal canal displays itself, we must so regulate the dose as to produce one more or less relaxed motion in the day. Watery motions ought to be avoided. In many cases the immoderate use of the bitter water would

only weaken the system, without hastening the cure. Even in dropsies resulting from enlargement of the liver or spleen, small doses are preferable to laxative ones, since they act more as diuretics, and also enervate, rather than depress the system. In hemorrhage, whether from the stomach or intestines, and also in obstinate vomiting, if of a chronic character, the bitter water is ordered only in tablespoonfuls, but repeated many times in the day, and success has justified the method. Another advantage of small doses is, that the patients make less objection to taking the bitter water and taken in this manner the bitter water is the cheapest remedy that can be found.

Most patients bear the bitter water of Friedrichshall very well; nevertheless in some cases of irritable stomach it does not agree. In these cases I have mixed this water with equal parts of spring water and obtained satisfactory results. Only that in two cases of chronic inflammation of the mucous membrane of the stomach, I was obliged to remit the use of the bitter water, until I had removed the vascular irritation of the stomach with the nitrate of silver.

The bitter water may be used all seasons in all places, and in all the conditions of life, it does not require any particular diet, nor walking, nor exercise in the open air, and if the patient avoids overloading the stomach, he has fulfilled all the dietetic directions of the treatment, and has no need to avoid such and such kinds of food as incompatible with the bitter water: it is enough if the food is suitable to the stomach. As to a certain amount of exercise in the open air, it is necessary for every man who wishes to preserve or recover his health; but it is not necessary that the patient using the bitter water, should on that account take morning walks, as for example, the waters of Ragozy and also of Elizabethen Brummen require. The patient then may use the bitter water without any alteration, during the treatment, of his usual mode of living, without forsaking his usual occupation, or purchasing his cure by any sacrifice whatever.

